

Advantech AE Technical Share Document

Date	2023/9/27	SR#	1-4105884893
Category	<input type="checkbox"/> FAQ <input checked="" type="checkbox"/> SOP	Related OS	N/A
Abstract	How to receive LoRaWAN end node data payload and parse data on TTNv3?		
Keyword	WISE, Data Log, Parser, JavaScript, LoRaWAN, The Things Network		
Related Product	WISE-2410, WISE-4610		

■ Problem Description:

This document explains how to receive LoRaWAN WISE-2410 vibration data payload and parse it into meaningful key-value on TTN (The Things Network).

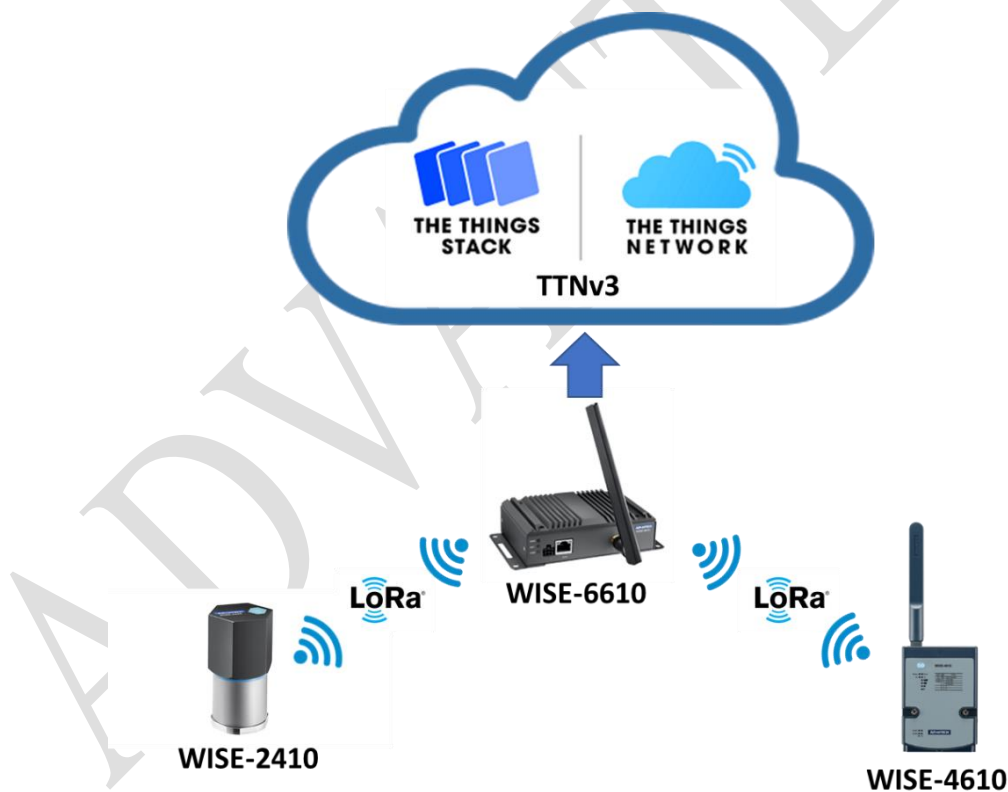


Figure. Topology of this document application.

■ Brief Solution - Step by Step:

Note: Please make sure all your LoRaWAN node, LoRaWAN gateway, TTN network server IP, and handler on TTN are matching the same frequency. In this example, we use the Frequency AS923 band LoRaWAN gateway and node for demonstration.

Preparation:

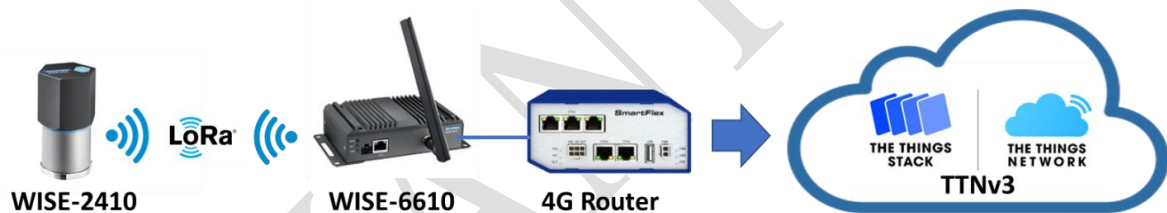
- ◆ WISE-2410-NA
- ◆ WISE-6610-Axxx
- ◆ A TTN (The Things Network) account.

Please follow the FAQ to connect WISE-2410 with WISE-6610 and set node to OTAA mode.

[How to connect WISE-2410 with WISE-6610?](#)

Step 1. Connect WISE-6610 gateway with public Network.

In this case, WISE-2410 transmits data to WISE-6610 through Lora, and connects to the 4G Router through Ethernet, so that the data reaches TTN through the Internet.



WISE-6610-A100-A

Status	Primary LAN Configuration		
General	DHCP Client	IPv4 enabled	IPv6 disabled
Network	IP Address	WISE-6610 obtains IP from 4G router DHCP server	
DHCP	Subnet Mask / Prefix		
IPsec	Default Gateway		
DynDNS	DNS Server		
System Log	Bridged	no	
	Media Type	auto-negotiation	
Configuration	<input type="checkbox"/> Enable dynamic DHCP leases		
LAN	IP Pool Start	IPv4 192.168.1.2	IPv6
VRRP	IP Pool End	192.168.1.254	
PPPoE	Lease Time	600	600 sec
Backup Routes	<input type="checkbox"/> Enable static DHCP leases		
Static Routes	MAC Address	IP Address	IPv6 Address
Firewall			
NAT			
OpenVPN			
IPsec			
GRE			
L2TP			
PPTP			
Services			
Expansion Port 1			
Expansion Port 2			
USB Port			
Scripts			
Automatic Update			
Customization			
User Modules			

Step 2. Get the TTN server domain names. The TTN server list is as follows:

Region	Router address
Europe 1 (Ireland)	eu1.cloud.thethings.network
Europe 2 (UK)	eu2.cloud.thethings.network
North America 1 (California, USA)	nam1.cloud.thethings.network
Australia 1 (Sydney, Australia)	au1.cloud.thethings.network

Set the router address as the Network Server on the WISE-6610 LoRaWAN gateway setting page. The **Upstream** and **Downstream** ports are set to **1700**. In this case, we use the North America 1 region router address “**nam1.cloud.thethings.network**” and set the port to **1700**.

Step 3. Register a LoRaWAN Gateway.

Launch your TTN account and enter the “**Gateways**” settings page, then click “**Register gateway**”.

THE THINGS STACK
Community Edition

[Overview](#)
[Applications](#)
[Gateways](#)
[Organizations](#)

[NAM1 Community](#)
Fair use policy applies

 Gateways (3)

[+ Register gateway](#)

Enter the **LoRaWAN Gateway Identifier** of WISE-6610 in “**Gateway EUI**” of the “**Register gateway**” page.

Navigation
Router
[Wizard](#)
[LoRaWAN Radio](#)
[• Packet Forward](#)
[• LoRaWAN Status](#)
[• Data Chart](#)
[Network Server](#)
[MQTT](#)
[Storage](#)
[Application Server](#)
[Licenses](#)
[Return to Router](#)

LoRaWAN Gateway Settings
LoRaWAN Radio Setting

Model Name
Radio Module
Radio Enable
Flow on MQTT
Radio 0 Main Frequency(KHz)
Radio 1 Main Frequency(KHz)

WISE-6610-A100-A
SX1301
On
Off
923000
922000

Channel 00
Channel 01
Channel 02
Channel 03
Channel 04
Channel 05
Channel 06
Channel 07

Enable
On
On
On
On
On
On
On

Radio Select
Radio 0
Radio 0
Radio 1
Radio 1
Radio 0
Radio 0
Radio 1

Offset(KHz)
200
400
200
400
-400
-200
0
0

Channel STD
Channel FSK

Enable
On
On

Radio Select
Radio 1
Radio 1

Bandwidth
250KHz
125KHz

SF
7
50000

Offset(KHz)
100
-200

Quick Setup Quick setting LoRaWAN Radio.

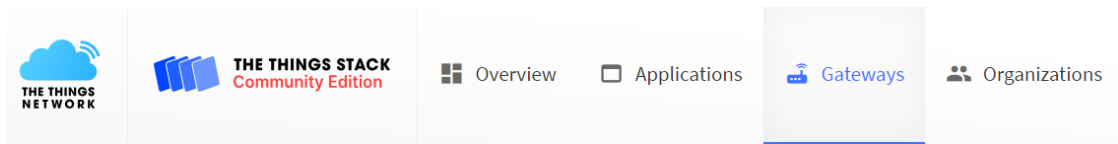
LoRaWAN Gateway Setting

LoRaWAN Gateway Identifier
IP address
Network server
Backup server
Backup Enable
Backup Timeout(15-120sec.)
Remote Network Server

74FE
A9
nam1.cloud.thethings.net
127.0.0.1
Off
15
root

Upstream Port
Downstream Port
1700
1700
1680
1680

Password
TLS
HTTP port
root
Off
8080



Register gateway

Register your gateway to enable data traffic between nearby end devices and the network.

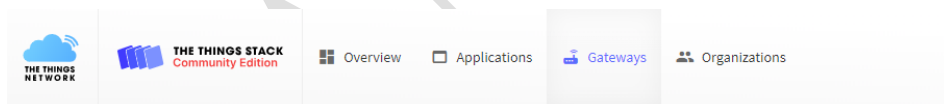
Learn more in our guide on [Adding Gateways](#).

Gateway EUI ¹

74 FE C9 A9 ²

To continue, please confirm the Gateway EUI so we can determine onboarding options

After clicking "Confirm", select the corresponding frequency according to the LoRaWAN node.



Register gateway

Register your gateway to enable data traffic between nearby end devices and the network.

Learn more in our guide on [Adding Gateways](#).

Gateway EUI [?]

74 FE 48 FF FE 46 C9 A9

Gateway ID [?] *

eui-74fe48ffe46c9a9

Gateway name [?]

My new gateway

Frequency plan [?] *

Asia 920-923 MHz

Frequency plan based on LoRaWAN nodes

☐ Require authenticated connection [?]

Choose this option eg. if your gateway is powered by [LoRa Basic Station](#)

Share gateway information

Select which information can be seen by other network participants, including [Packet Broker](#)

- ☐ Share status within network [?]
- ☐ Share location within network [?]

Step 4. Check Gateway status is **connected**

Gateways (3)

ID	Name	Gateway EUI	Status	Created at
eui-74fe48fffe46c9a9	6610-A100	74 FE C9 A9	Connected	3 hours ago
eui-74fe48fffe4c9d10	WISE-6610-EU	74 FE 48 FF FE 4C 9D 10	Other cluster	Dec 6, 2022
eui-74fe48fffe4fbb1a-1	6610	74 FE 48 FF FE 4F BB 1A	Disconnected	Oct 11, 2022

Step 5. Add an application.

Applications (2)

ID	Name	End devices	Created at
2410eu	TTNv3 test	1	Dec 6, 2022
2410na	TTNv3 test	2	Oct 13, 2022

Step 6. Add end device in the Applications page

Applications > TTNv3 test > End devices

End devices (2)

ID	Name	DevEUI	JoinEUI	Last activity
eui-74fe48ffff7a1bea		74 FE 48 FF FF 7A 1B EA	00 00 00 00 32 34 31 30	32 sec. ago
eui-74fe48ffff556e5e		74 FE 48 FF FF 55 6E 5E	74 FE 48 FF FF 55 6E 5E	Oct 27, 2022

Enter the required information for the LoRaWAN node.

Applications > TTNv3 test > End devices

Register end device

Does your end device have a LoRaWAN® Device Identification QR Code? Scan it to speed up onboarding.

[Scan end device QR code](#) [Device registration help](#)

End device type

Input method ⓘ

1 ☐ Select the end device in the LoRaWAN Device Repository

1 ☒ Enter end device specifics manually

Frequency plan ⓘ *

2 Asia 920-923 MHz

LoRaWAN version ⓘ *

3 LoRaWAN Specification 1.0.2

Regional Parameters version ⓘ *

4 RP001 Regional Parameters 1.0.2

[Show advanced activation, LoRaWAN class and cluster settings](#)

Provisioning information

JoinEUI ⓘ *

5 00 00 00 00 00 32 34 31 30 6 Confirm 6

To continue, please enter the JoinEUI of the end device so we can determine onboarding options

WISE-2410-TB

Information RF Module Time & Date Scheduling Control General Firmware

RF Module

Operation Region TW

ISM Band AS923MHz

RF Operation Mode LoRaWAN

Device Class Class A

Activation Mode OTAA

Adaptive Data Rate ☒

Device EUI 74FE48FFFF7A1BEA

Application Information

Application EUI 0000000032343130

Application Key 00000000000000000000000000000000

WISE-2410-TB

Information Configuration I/O Status Site Survey Advanced

Configuration

Information RF Module Time & Date Scheduling Control General Firmware

RF Module

Operation Region TW

ISM Band AS923MHz

RF Operation Mode LoRaWAN

Activation Mode OTAA

Device Class Class A

Adaptive Data Rate ☒

1 Device EUI 74FE48FFFF7A1BEA

Application Information

Application EUI 0000000032343130

2 Application Key 00000000000000000000000000000011

Application Port

Frequency plan AS 920-923 MHz

LoRaWAN version LoRaWAN Specification 1.0.2

Regional Parameters version RP002 Regional Parameters 1.0.2

Show advanced activation, LoRaWAN class and cluster settings

Provisioning information

JoinEUI 00 00 00 00 32 34 31 30

This end device can be registered on the network

DevEUI 1 74 FE 48 FF FF 7A 1B EA 0/50 used

AppKey 2 00 00 00 00 00 00 00 00 00 00 00 00 00 11

End device ID eui-74fe48ffff7a1bea

This value is automatically prefilled using the DevEUI

After registration

☒ View registered end device

☐ Register another end device of this type

3

Step 7. Check End device status is connected

THE THINGS NETWORK THE THINGS STACK Community Edition Overview Applications Gateways Organizations

TTNv3 test

Overview End devices Live data Payload formatters Integrations

Applications > TTNv3 test > End devices

End devices (2)

Search Import end devices Register end device

ID	Name	DevEUI	JoinEUI	Last activity
eui-74fe48ffff7a1bea		74 FE 48 FF FF 7A 1B EA	00 00 00 00 32 34 31 30	59 sec. ago
eui-74fe48ffff556e5e		74 FE 48 FF FF 55 6E 5E	74 FE 48 FF FF 55 6E 5E	Oct 27, 2022

Step 8. Check the "Real-time Data" page to receive data from end nodes.

The screenshot shows the 'Live data' page in The Things Stack. The left sidebar has 'Live data' highlighted with a red box. The main area shows a table of data messages:

Time	Entity ID	Type	DevAddr	Payload	FPort
09:48:03	eui-74fe48ffff7...	Forward uplink data message	26 0C 36 AB	81 0A 58 50 08 07 00 00 ...	FPort
09:47:03	eui-74fe48ffff7...	Forward uplink data message	26 0C 36 AB	81 09 58 50 08 07 00 00 ...	FPort
09:46:03	eui-74fe48ffff7...	Forward uplink data message	26 0C 36 AB	81 08 58 50 08 07 00 00 ...	FPort
09:45:03	eui-74fe48ffff7...	Forward uplink data message	26 0C 36 AB	81 07 58 50 08 07 00 00 ...	FPort
09:44:03	eui-74fe48ffff7...	Forward uplink data message	26 0C 36 AB	81 06 58 50 08 07 00 00 ...	FPort
09:43:03	eui-74fe48ffff7...	Forward uplink data message	26 0C 36 AB	81 05 58 50 08 07 00 00 ...	FPort

Step 9. Set the payload decoder.

The first screenshot shows the 'Payload formatters' menu with 'Uplink' selected (indicated by a red box and number 2). The second screenshot shows the 'Default uplink payload formatter' configuration page. The 'Formatter type' is set to 'Custom Javascript formatter' (indicated by a red box and number 3). The 'Formatter code' field contains the following JavaScript code:

```
1 function decodeUplink(input) {
2   return {
3     data: {
4       bytes: input.bytes
5     },
6     warnings: [],
7     errors: []
8   };
9 }
```

A red arrow points from the 'Copy and paste sample code here' text to the code field.

Download the sample code from the support portal and copy and paste it.

<https://www.advantech.com/en/support/details/utility?id=1-1UAZL7H>

Javascript Payload Parser

2023-09-27 | Utility | Document No.1-4009224221

Related Product:

WISE-2200-M/ WISE-2410/ WISE-2410X/ WISE-4610

Solution:

Javascript Payload Parser (Standard)

Javascript Payload Parser (TTN)

Step 10. Check the end done live data is parsed.

The screenshot shows the 'The Things Stack Community Edition' interface. The 'Applications' tab is selected, and the 'TTNV3 test' application is chosen. The 'Live data' view is active, displaying a table of 'Forward uplink data message' events. A red box highlights the 'Payload' column, and a red text overlay states: "End node data is parsed".

The screenshot shows the 'Event details' view for a specific data message. The 'decoded_payload' section is highlighted with a red box, showing a JSON object with accelerometer data. The JSON structure is as follows:

```

{
  "received_at": "2023-09-28T03:15:59.287389212Z",
  "uplink_message": {
    "session_key_id": "AYrZqTw2RwWjh3/Y8AcVn==",
    "f_port": 1,
    "f_cnt": 39,
    "frm_payload": "dSVYIAGHAAAAAGwAAEPRd4v8AAUABQAEAM3/1ADr/wAAA",
    "decoded_payload": {
      "payload": {
        "Accelerometer": {
          "LogIndex": 16157,
          "Time": 1695870971,
          "X-Axis": {
            "CrestFactor": 2.12,
            "Deviation": 0,
            "Kurtosis": -0.51,
            "OAVelocity": 0.05,
            "Peak-to-Peak Displacement": 1,
            "Peakmg": 0.005,
            "RMSmg": 0.004,
            "SenEvent": 0,
            "Skewness": -0.21
          },
          "Y-Axis": {
            "CrestFactor": 0,
            "Deviation": 0,
            "Kurtosis": 0,
            "OAVelocity": 0.04,
            "Peak-to-Peak Displacement": 0,
            "Peakmg": 0.005,
            "RMSmg": 0.004,
            "SenEvent": 0,
            "Skewness": 0
          }
        }
      }
    }
  }
}

```

Notes: Please use **DR5-SF7/125KHz** to set the end node "Data Rate", otherwise you will receive a "fragmentation message, please use higher transmission data rate on your device" error message.

The screenshot shows the 'Live data' view for the 'TTNV3 test' application. The 'Data preview' table shows multiple 'Forward uplink data message' events. A red box highlights the 'Payload' column, which contains the error message: "fragmentation message, please use higher transmission data rate on your device".